



**29**<sup>th</sup> Annual **INCOSE**  
international symposium

Orlando, FL, USA  
July 20 - 25, 2019

# Systems Engineering & Complex Systems Governance – Lessons for Better Integration

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**Who's teaching  
what the world  
needs most?**

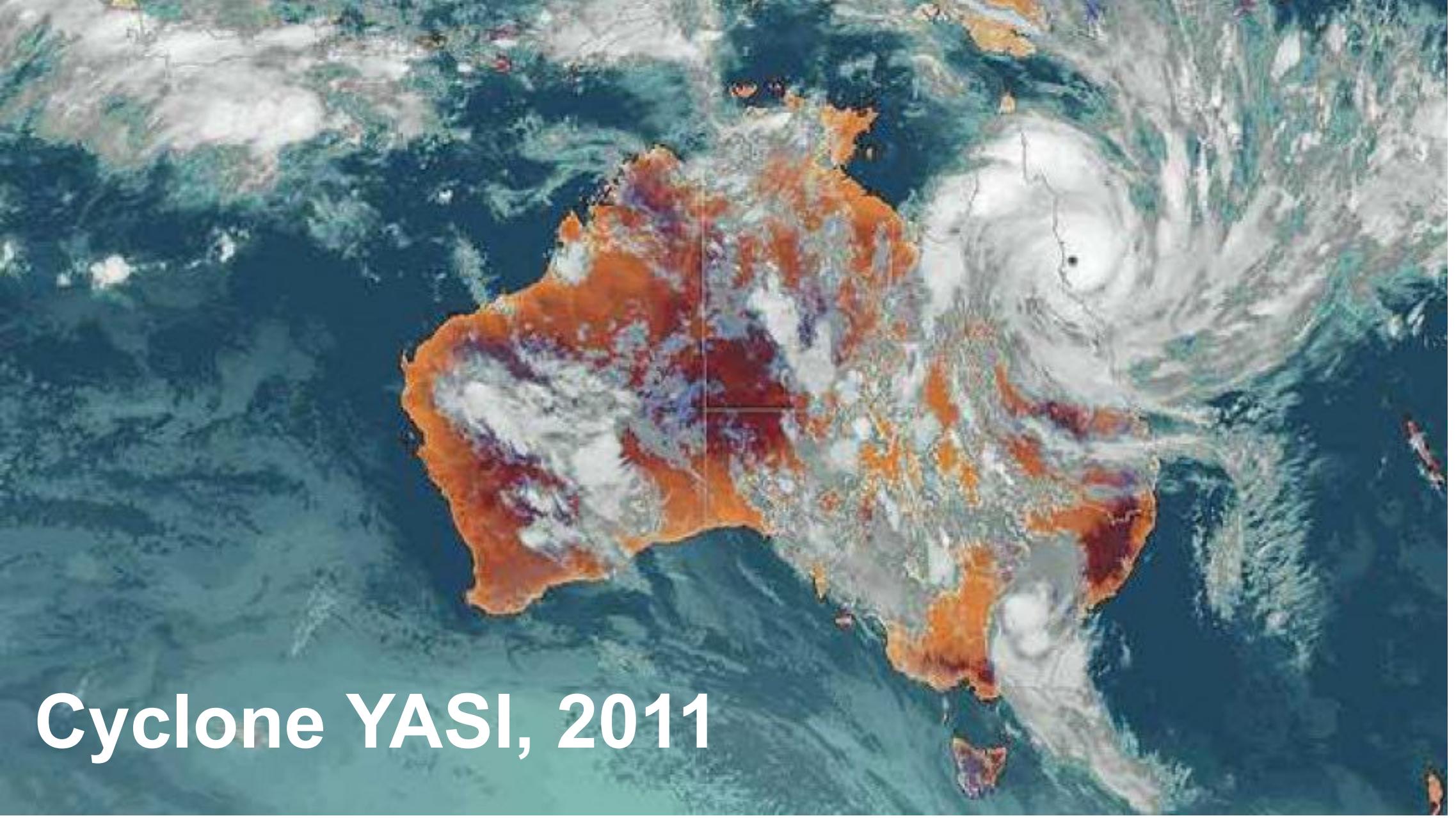




# High Op Tempo



**Short term priorities  
vs.  
Long-term sustainability  
...systemic risk...**



# Cyclone YASI, 2011



# Rizzo Reforms

Plan to Reform  
Support Ship Repair and  
Management Practices

July 2011



**Integrated  
Risk Management**



# Story of two halves...



Plan to Reform  
Support Ship Repair and  
Management Practices  
July 2011

2012-2014

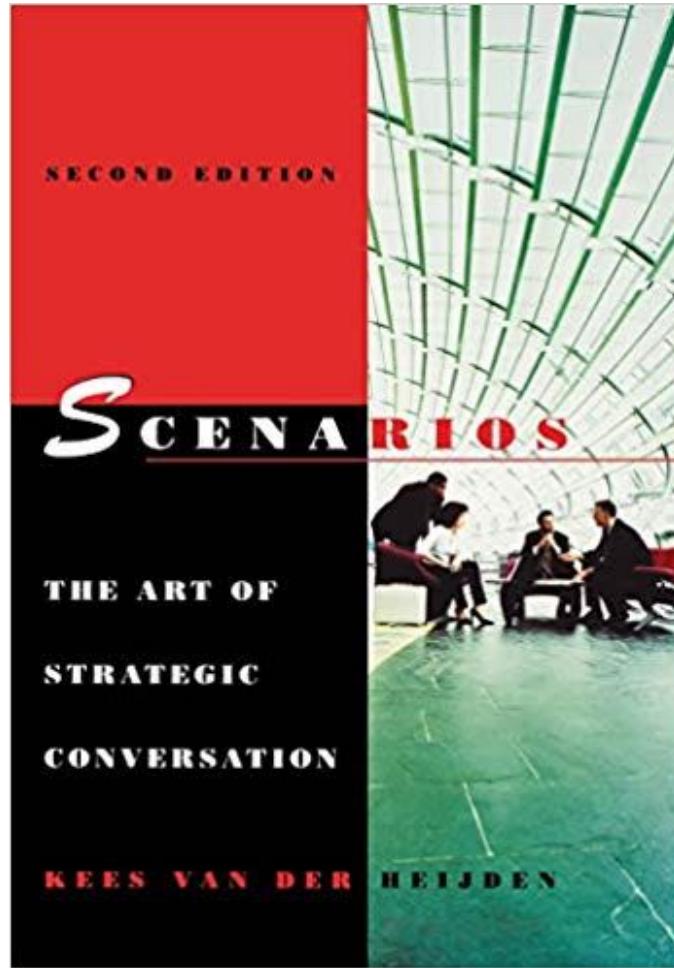
Risk management  
+ Systems engineering

2015-2018

Complex systems governance  
Systems engineering embedded



# Why ...



“ Where uncertainty is present, strategy moves from **finding the one best strategy** to **creating the most skillful process**... ”

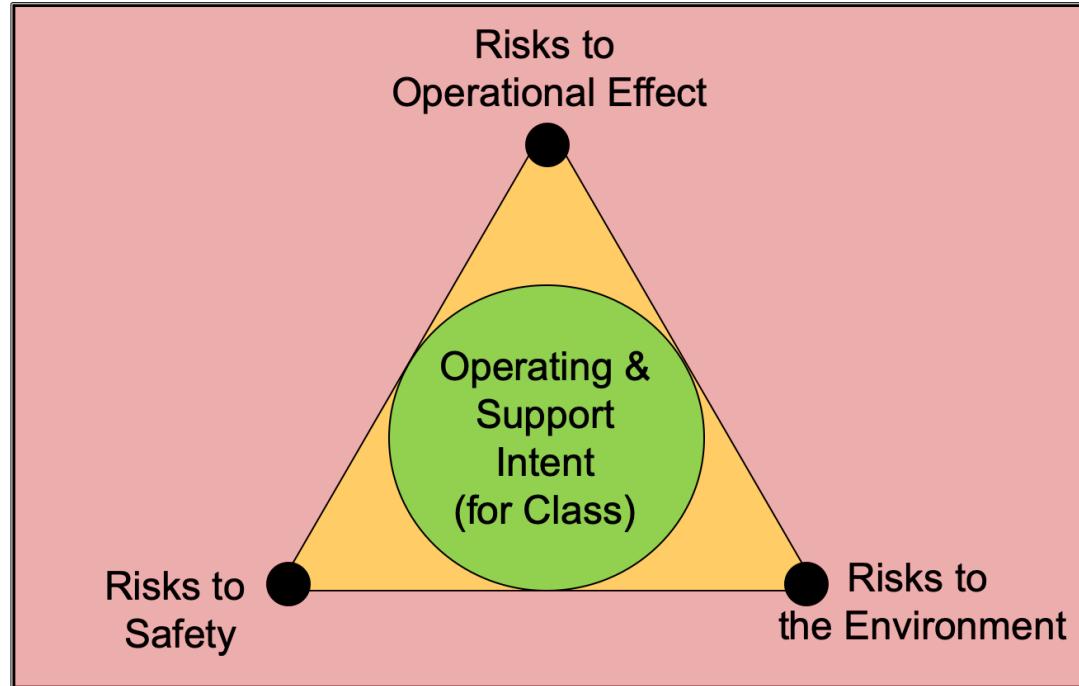
Kees van der Heijden, 1996



# Round 1: 2012 - 2014

## Concept for Risk Categorisation

Full scope of Navy Operations

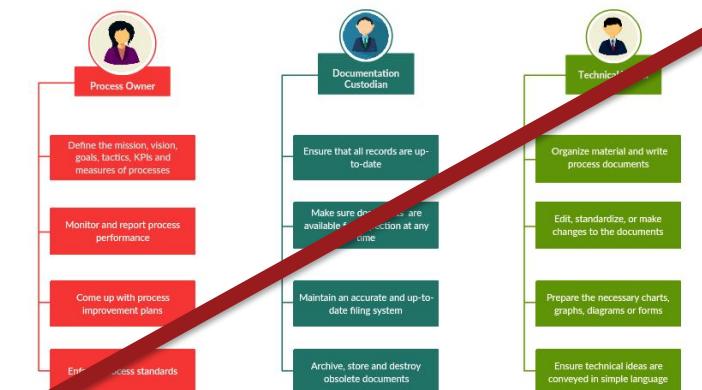


- Risk to maritime system managed by operator within OSI
- Risk managed with advice of authority for safety / operations / environment
- Risk managed with authority (or delegation) of Chief of Navy

## Systems Documentation



## Proposed Organisation Design



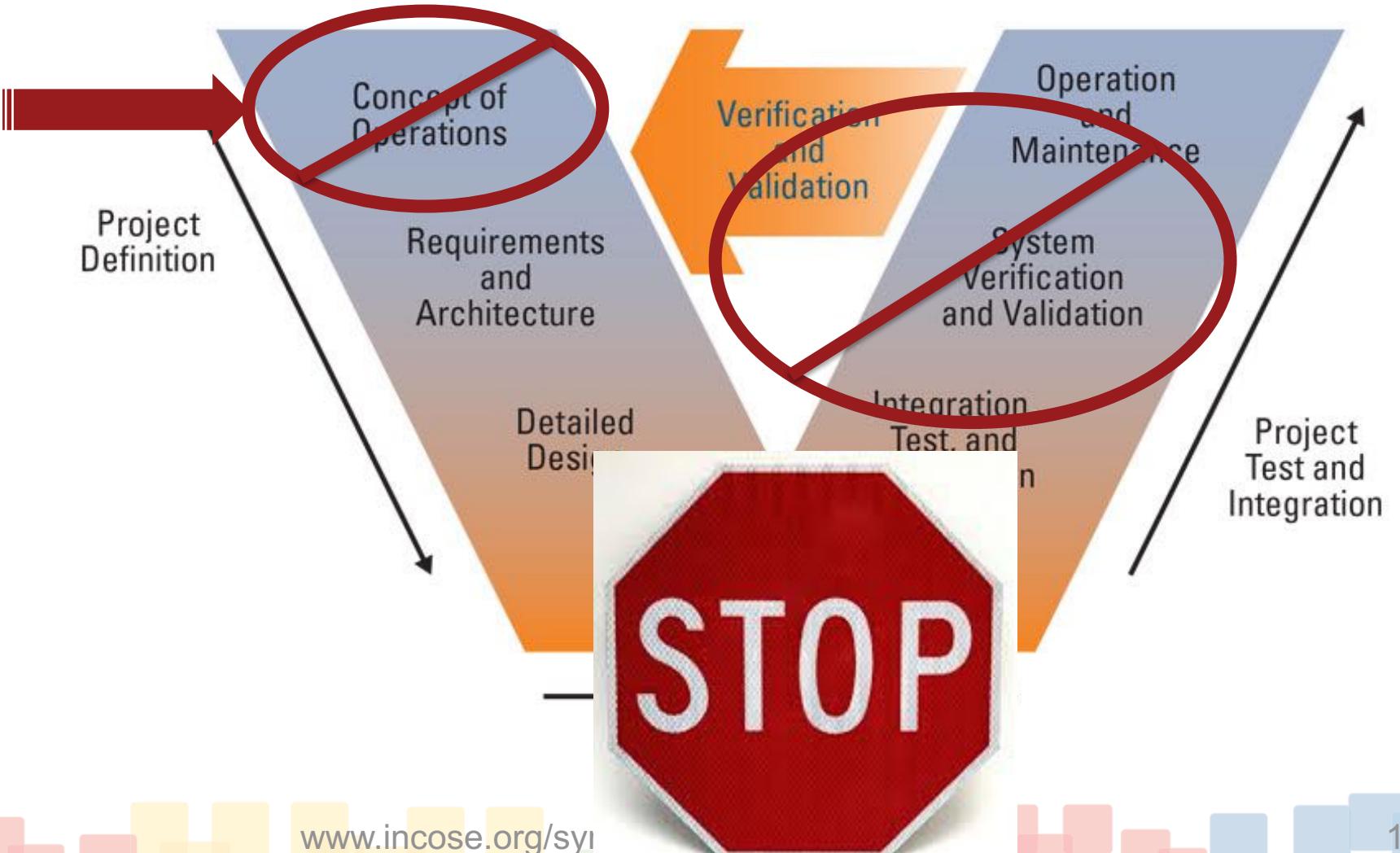


# Round 1: 2012 - 2014

## Integrated Risk Management

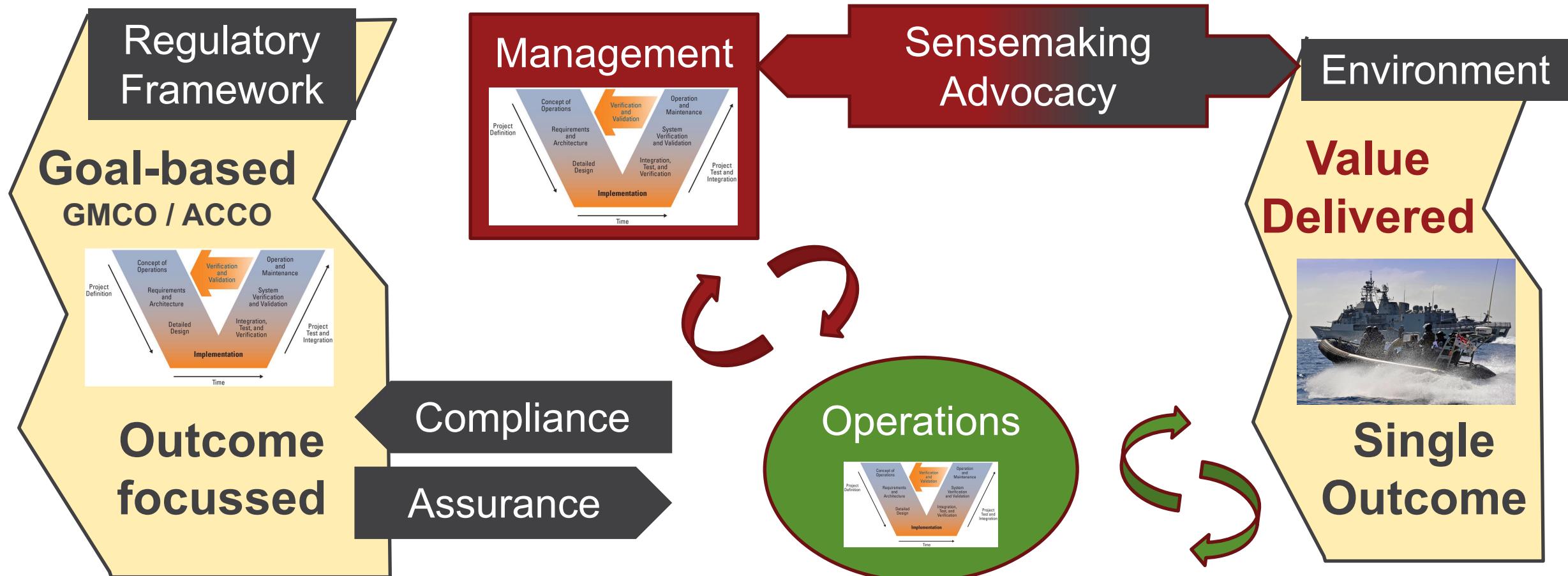


Plan to Reform  
Support Ship Repair and  
Management Practices  
July 2011





# Round 2: 2015 – 2018





# Main differences (1)



**EDUCATE  
TO  
AVOID  
MODE LOCK  
(Don't rush to action)**



# Main differences (2)

**OUTCOME  
FOCUS**  
(Equiv. 1<sup>st</sup> Principle of War)





# Main differences (3)



**PRINCIPLES  
FOR  
BEHAVIOUR  
(ROLE MODEL)**

# Lesson 1

**START WITH  
STRATEGIC  
THINKING**

Why?  
Who?  
What?

# Lesson 2



## AVOID FUNCTION TRAP

“Organisational silos disperse information and responsibility... [and] inhibit discussion of how risks interact. Good risk discussions must not only be confrontational but also integrative.

Kaplan & Mikes, HBR, 2012

# Lesson 3



ITERATE

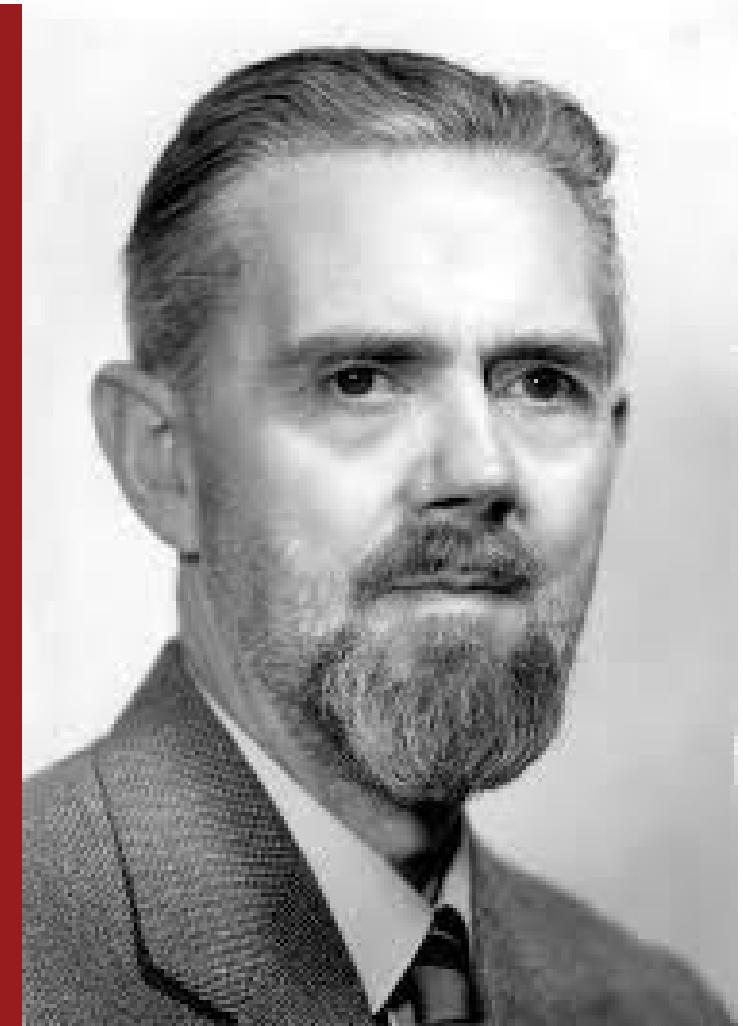
Design  
Build  
Implementation

# Lesson 4

William Ross Ashby  
(1903 – 1972)



REMEMBER  
ASHBY'S LAW  
OF  
REQUISITE VARIETY



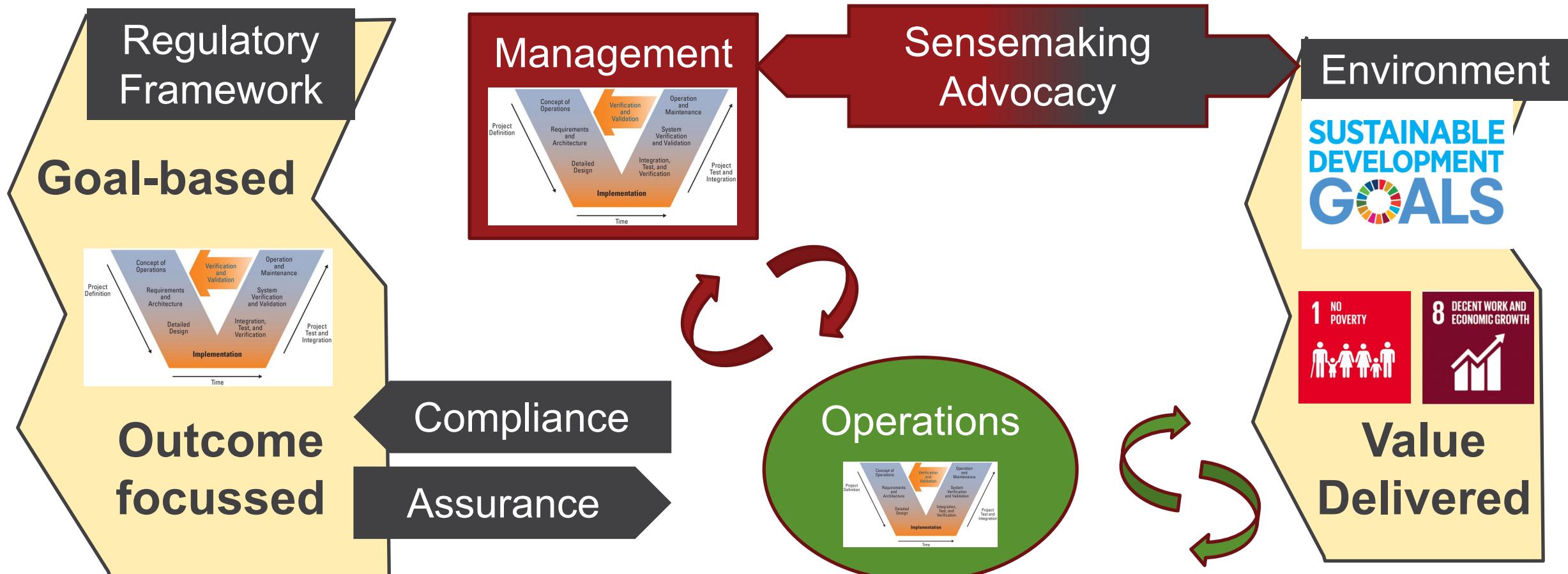
# Lesson 5



**EDUCATE  
OPERATIONALIZE EDUCATION  
SUPPORT SYSTEMIC INTERVENTION**



# Bigger goals might be possible...





# Systems Engineers Super Power?

# Integration

with the care of a physician...



# With thanks to co-authors...

- Dr. RICHARD HODGE
- Mr. STEPHEN CRAIG
- Dr. JOSEPH BRADLEY
- Prof. CHARLES KEATING



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